Date: September 23, 2009

Title: 2.3 Part II - Proportions and Measurement Systems

Objective: Apply proportions to the "real world".

IN:

How long is Mr. Basile's foot in inches if it is 28.2 centimeters?

Jonas drove his car from Montana to Canada on vacation. While there, he needed to buy gasoline and noticed that it was sold by the liter rather than by the gallon. Use the conversion factor 1 gallon $\approx$ 3.79 liters to determine how many liters will fill his 12.5-gallon gas tank.

Using the conversion factor, you can write the proportion $\frac{3.79 \text{ liters}}{1 \text{ gallon}} = \frac{x \text{ liters}}{12.5 \text{ gallons}}$

$$\frac{3.79}{1} = \frac{x}{12.5}$$ Original proportion.

$$12.5 \cdot 3.79 = x$$ Undo the division.

$$x = 47.375$$ Multiply.

Jonas' tank will hold about 47.4 liters of gasoline.

Dimensional Analysis!

A radio-controlled car traveled 30 feet across the classroom in 1.6 seconds. How fast was it traveling in miles per hour?

Dimensional Analysis!

Using the given information, you can write the speed as the ratio $\frac{30 \text{ feet}}{1.6 \text{ seconds}}$. Multiplying by 1 doesn't change the value of a number, so you can use conversion factors that you know $\left(\text{like } \frac{60 \text{ minutes}}{1 \text{ hour}}\right)$ to create fractions with a value of 1. Then multiply your original ratio by those fractions to change the units.

$$\frac{30 \text{ ft}}{1.6 \text{ s}} \cdot \frac{60 \text{ s}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ h}} \cdot \frac{1 \text{ mi}}{5{,}280 \text{ ft}} = \frac{108{,}000 \text{ mi}}{8{,}448 \text{ h}}$$

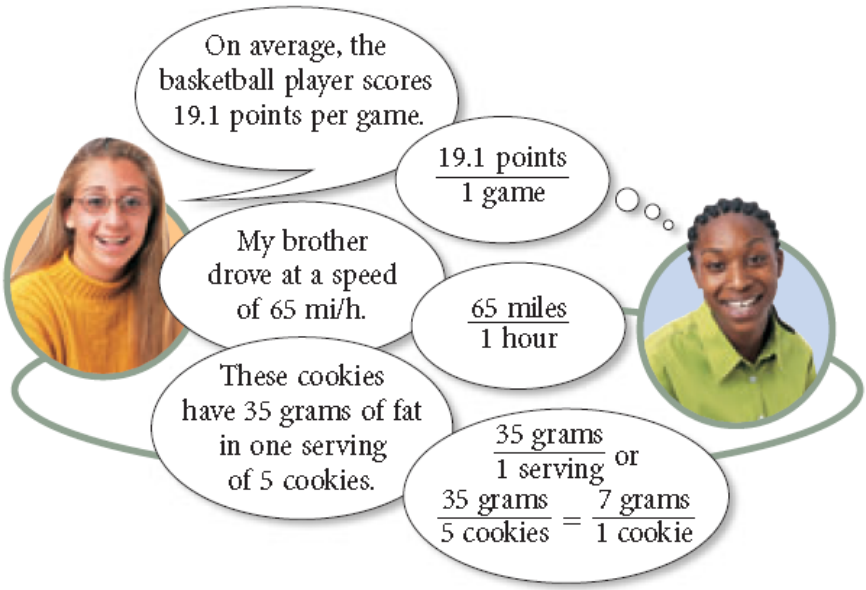
$$\approx \frac{12.8 \text{ mi}}{1 \text{ h}} \text{ or } 12.8 \text{ miles per hour}$$

Dimensional Analysis!

Each of the fractions after the first one has a value of 1 because the numerator and denominator of each fraction are equivalent: 60 s = 1 min, 60 min = 1 h, and 1 mi = 5280 ft. The fractions equivalent to 1 are chosen so that when units cancel, the result is miles in the numerator and hours in the denominator.

The speed 12.8 miles per hour is a **rate** because it has a denominator of 1.

Unit Rates



Unit Rates

Tab and Crystal both own cats.

a. Tab buys a 3-pound bag of cat food every 30 days. At what rate does his cat eat the food?

b. Crystal buys a 5-pound bag of cat food every 45 days. At what rate does her cat eat the food?

c. Whose cat, Tab's or Crystal's, eats more food per day?

Out:

If chocolate chip cookies have 46 grams of fat in one serving of 4 cookies, how many grams of fat is in one cookie?

Homework:
Page 111-112
#3, 6, 8, 9 all parts

Summary:

Dimensional analysis will...